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Issued April 7, 1909.

U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF ANIMAL INDUSTRY.—CIRCULAR 140.

A. D. MELVIN, CHIEF OF BUREAU.

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THE EGG TRADE OF THE UNITED STATES.

BY

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WASHINGTON:  
GOVERNMENT PRINTING OFFICE.  
1909.

## LETTER OF TRANSMITTAL.

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U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF ANIMAL INDUSTRY,  
*Washington, D. C., January 28, 1909.*

SIR: I have the honor to transmit herewith, and to recommend for publication as a circular of this Bureau, a paper on "The Egg Trade of the United States," by Mr. Milo M. Hastings, scientific assistant in the Animal Husbandry Office of this Bureau, presenting the results of a study made during the past year of the conditions surrounding the production and marketing of eggs, with a view to determining causes of deterioration in quality and consequent loss. It appears that there is an enormous loss due to the spoiling of eggs which could be largely prevented by improved methods, and in this article the causes of such loss are pointed out and suggestions made for remedying them.

Respectfully,

A. D. MELVIN,  
*Chief of Bureau.*

Hon. JAMES WILSON,  
*Secretary of Agriculture.*

[Cir. 140]

# CONTENTS.

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	Page.
Introduction .....	5
Quality in eggs .....	6
Freshness not the only vital point of quality .....	6
How eggs are graded .....	6
Variation in eggs when laid .....	7
Shell variation .....	8
Size of eggs .....	9
Detrimental changes in eggs and consequent losses .....	10
Dirty eggs .....	10
Broken eggs .....	10
The development of chicks (heated eggs) .....	10
Evaporation (held or shrunk eggs) .....	13
Bacterial contamination (rots) .....	14
Molding or mustiness .....	16
Absorption of odors .....	16
Summary of losses due to detrimental changes .....	16
Loss by curtailed consumption .....	16
The consumer's position .....	17
Increased gain to dealers and farmers from improved methods .....	18
Methods of marketing eggs .....	18
The country merchant .....	19
The egg shipper .....	20
The city egg dealer .....	22
The city retailer .....	22
Variations in trade methods .....	24
The cold storage of eggs .....	25
Preserving eggs by other means than cold storage .....	27
How to effect improvement .....	28
Pure-food laws .....	28
Buying on a quality basis .....	28
Remedies for the general-store evil .....	30
Buying eggs by weight .....	32
Requisites for the production of good eggs .....	32
General summary .....	33

## ILLUSTRATIONS.

---

	Page.
Fig. 1.—Candling and sorting eggs.....	7
2.—Egg room in a large eastern cold-storage plant.....	26

[Cir. 140]

# THE EGG TRADE OF THE UNITED STATES.

## INTRODUCTION.

The rapid growth of the poultry industry has lately received much attention from the press of the country. The best estimates available indicate that the income from poultry products is one of the four or five most important sources of the agricultural wealth of the nation. The recent improvements in the methods and practices of poultry husbandry and the rapid development of extensive poultry plants have also been the subject of much comment.

Although the poultry plant is steadily gaining ground in the Eastern States and also in the far West, the great bulk of the poultry wealth of the country is produced by the general farms of the Mississippi Valley, and it is also in this region that the most rapid increase in production is shown. Some idea of the rapid growth of the poultry industry in this region may be obtained from the figures for Kansas, a State where the exclusive poultry farm is practically unknown. The secretary of the Kansas state board of agriculture gives the following statistics:

### *Value of poultry and eggs sold in Kansas.*

1903 -----	\$6, 498, 856
1904 -----	7, 551, 871
1905 -----	8, 541, 153
1906 -----	9, 085, 896
1907 -----	10, 300, 082

In spite of the rapid increase in the production of poultry products, the supply has not kept pace with the demand. The proof for this statement is the fact that the price of eggs for the last ten or twelve years has shown not only an absolute rise but also a relative rise when compared with the general average of values of either farm crops or food products. In contrast, however, with these encouraging facts concerning the poultry industry, some critics have stated that the farmer does not realize a sufficient sum for his produce, compared with what the city consumer has to pay for strictly fresh goods, and that the quality of American eggs in the general market is decidedly inferior to that of several European countries.

The present circular is the result of an investigation of these criticisms as applied particularly to the egg crop, which constitutes about 60 per cent of the total value of poultry products.

### QUALITY IN EGGS.

#### FRESHNESS NOT THE ONLY VITAL POINT OF QUALITY.

As a general rule, we consider freshness a desirable quality in food products. This rule is not universal, however, for, while we prefer fresh fruit, fresh fish, and fresh eggs, other articles, such as cheese and wine, are considered more desirable after an aging process.

To food products which have changed in an undesirable manner we apply the terms "stale," "soured," "decomposed," "decayed," or "rotten." If in other food products processes occur that produce a pleasant change, we speak of such food as "fermented," "cured," or "ripened." In the case of eggs all changes that take place are held in great disfavor by consumers. The two changes which cause the greatest objection are due to the development of the embryo chick or to the formation in the decaying eggs of the very foul-smelling hydrogen-sulphid gas.

Because of the readiness with which eggs spoil, the term "fresh" has become synonymous with the idea of desirable quality in eggs. However, the actual age of an egg is only one of the factors which affect the quality. An egg 48 hours old that has lain in a wheat shock during a warm July rain would probably be swarming with bacteria and be absolutely unfit for food, while another egg stored eight months in a first-class cold-storage room would be of much better quality.

#### HOW EGGS ARE GRADED.

Eggs are among the most difficult of food products to grade. This is because each egg must be considered separately, and because the actual substance of the egg can not be examined without destroying the egg.

From external appearance eggs can be selected for size, color, cleanliness of shell, and freedom from cracks. This is the common method of grading in early spring, when the eggs are uniformly of good quality. Later in the season the egg candle is used. In the technical sense any kind of a light may be used for an egg candle. A 16-candle-power electric lamp is the most desirable. The light is inclosed in a box or a tin cylinder, in which are made openings about the size of a half dollar. The room being darkened, the candler holds the egg to the light, large end upward, and gives it a quick turn in order to view all sides and to cause the contents to whirl within the shell.

(See fig. 1.) To the expert this process reveals the actual condition of the egg to an extent that the novice can hardly realize. The art of egg candling can not be readily taught by worded description. One who wishes to learn it had best go to an adept, or he may begin unaided and by breaking many eggs learn the essential points.

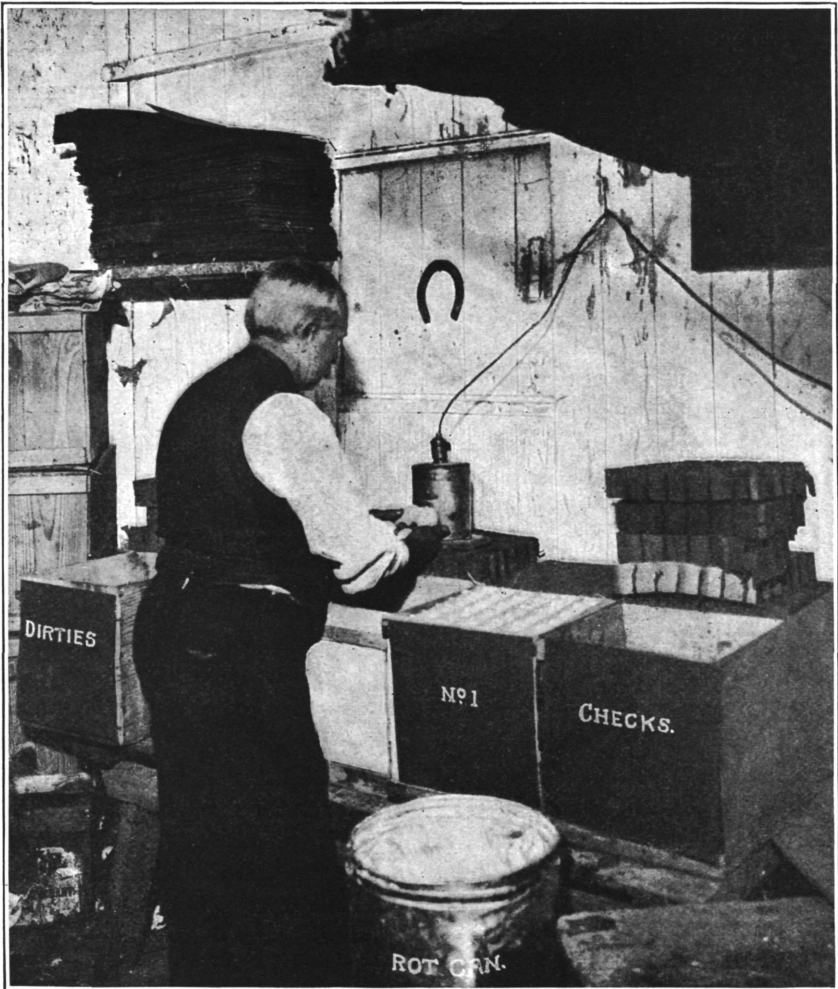


FIG. 1.—Candling and sorting eggs. (The No. 2 quality eggs are placed in a box to the left of the candler, which is hidden from view in the picture. This picture was taken by flash light, as candling must be done in a dark place.)

#### VARIATION IN EGGS WHEN LAID.

Eggs when laid differ considerably in size, but otherwise are a very uniform product. The purpose of the egg in nature requires that this be the case, because the contents of the egg must be so pro-

portioned as to form the chick without surplus or waste, and this requires a chemical composition that varies but slightly.

For food purposes all fresh eggs are practically equal. The tint of the yolk varies somewhat, being more yellow when green feed has been supplied the hens. Occasionally when hens eat unusual quantities of green feed the yolks show a greenish-brown tint and appear dark to the candle. Such eggs are called "grass eggs." They are perfectly wholesome.

An opinion exists among egg men that the white of the spring egg is of finer quality and will "stand up" better than that of summer eggs. This is true enough of commercial eggs, but the difference is chiefly, if not entirely, due to external factors that act upon the egg after it is laid.

The flavor or odor of an egg may be noticeably influenced by the feed of the hen. This has been demonstrated by feeding hens heavily on onion tops or garlic. So far as is known to the writer, no practical application has been made of this principle.

There are some other peculiarities that may exist in eggs at the time of laying, such as blood clots inclosed within the egg, a broken yolk, or perhaps bacterial contamination. The so-called "tapeworms" of eggs are detached portions of the lining membrane. "Liver spots" or "meat spots" are detached folds from the walls of the oviduct. All such abnormalities are rare, difficult to detect or prevent, and are so inconsequential when compared with the eggs which are spoiled after laying that further consideration will not be given to them.

#### SHELL VARIATION.

The shells of eggs vary in shape, color, and firmness. These variations are more a matter of breed and the individuality of the hen than of care or feed. The strength of eggshells is important, because breakage is a source of considerable loss to the trade. However, the difficulty of weak-shelled eggs is not one which can be easily remedied. Nothing more can be advised than to feed a ration containing plenty of mineral matter and to discard hens that lay noticeably weak-shelled or irregularly shaped eggs.

The color of eggshells is a matter in regard to which more has perhaps been said in poultry papers than the trade facts warrant. It is commonly stated that Boston and surrounding towns want brown eggs, while New York and San Francisco demand white eggs. These trade fancies probably result from the fact that there are large henneries in the respective localities producing eggs of the favored color. If the eggs from such farms are the best in the market and are uni-

formly of a particular shade, that mark of distinction, like the trade name on a popular article, would naturally become a selling point. Only the select trade, even in the cities mentioned, considers the color in buying. Uniformity of appearance in color as well as in other points pleases the eye, and for that reason and no other should distinction be made. Eggs of all Mediterranean breeds are white, those of Asiatics are brown, and those of American breeds are usually brown, but not of so uniform a tint.

#### SIZE OF EGGS.

The size of eggs is chiefly controlled by the breed or by selection of layers of large eggs. In a number of tests at experiment stations slight differences in the sizes of eggs have been noted with varying rations and environment, but this can not be attributed to anything more specific than the general development and vigor of the fowls. Pullets at the beginning of the laying period lay an egg decidedly smaller than those produced at a later stage in life. The average food value of large eggs is slightly greater per pound than that of small eggs because of a smaller percentage of shell in the former.

The following table gives the sizes of representative classes of eggs. These figures must not be applied too rigidly, as the eggs of all breeds and all localities vary. They are given as describing the eggs one may reasonably expect to find in the class mentioned. It should be borne in mind that the two classifications given in the table are entirely independent of each other; the breeds mentioned in the second column are not the ones which lay the eggs mentioned in the first column, though they lay eggs of the same size.

*Table of representative egg sizes.*

Geographical classification.	Breed classification.	Net weight per 30-dozen case.	Weight per dozen.	Relative values per dozen.
		<i>Pounds.</i>	<i>Ounces.</i>	<i>Cents.</i>
Eggs from poorest flocks of southern dunghills.	Games and Hamburgs.....	36	19½	20
Average Tennessee or Texas eggs..	Poor strains of Leghorns .....	40	21½	22½
Average for the United States as represented by Kansas, Minnesota, and southern Illinois.	The mixed barnyard fowl of the western farm, largely of Plymouth Rock origin.	43	23	23½
Southern Iowa's "two-ounce eggs".	Purebred flocks of American varieties, or egg-farm Leghorns.	45	24	25
Average size of eggs produced in Denmark.	American Brahmas and Minorcas.	48	25½	26½
Selected brands of Danish eggs.....	Equalled by several pens of Leghorns in the Australian laying contest.	54	28½	30

## DETRIMENTAL CHANGES IN EGGS AND CONSEQUENT LOSSES.

## DIRTY EGGS.

Dirty eggs are grouped roughly in three classes—(a) “plain dirties,” those to which soil or dung adheres; (b) stained eggs, those soiled by contact with damp straw or other material which discolors the shell (plain dirties when washed usually show this appearance); (c) smeared eggs, those covered with the contents of broken eggs.

For the first two classes the farmer is to blame. The third class originates all along the route from nest to consumer. The percentage of dirty eggs varies with the season and weather conditions, being noticeably increased during rainy weather. About 5 per cent of all eggs are culled out as “dirties,” and these are sold at a loss of at least 20 per cent. This makes a financial loss of 1 per cent of the total value of the nation’s egg crop.

There is another loss caused by dirty eggs which is fully as serious. It is the loss due to the fact that in a lot of eggs so handled as to produce 5 per cent of “dirties” the remainder of the lot will show enough spotted and stained eggs to give the whole lot an inferior appearance. The amount of depreciation from this source is difficult to estimate, but it is undoubtedly as great as the direct loss on those culled out.

## BROKEN EGGS.

The common trade name for cracked eggs is “checks.” “Blind checks” are those in which the break in the shell is not readily observable. These are detected with the aid of the candle or by clicking the eggs together. “Dents” are checks in which the egg shell is pushed in without rupturing the membrane. “Leakers” have lost part of the contents and are not only a loss themselves, but produce smeared eggs.

The loss from mechanical injury varies considerably with the amount of handling in the process of marketing. A western produce house collecting from grocers by local freight will record from 4 to 7 per cent of checks. These same eggs in further handling will have an additional checking of 1 to 3 per cent. Eight per cent of the eggs from hen to market is probably a fair estimate for broken eggs. The depreciation of such eggs is greater than that of dirties, being about 25 per cent. This gives a financial loss due to checks of 2 per cent.

## THE DEVELOPMENT OF CHICKS (HEATED EGGS).

The laying of an egg is not analogous to birth in the case of a mammal, and the presence of the male bird is not essential for the laying  
[Cir. 140]

of the egg; hence eggs laid by hens kept away from males are entirely free from the changes presented under this head.

That such infertile eggs can not spoil, however, is a mistaken notion, for they are subject to all the other factors which cause eggs to spoil. The sale of eggs tested out of incubators has been encouraged by the assertion that incubation does not spoil infertile eggs for food purposes. In practice the idea works great harm. Eggs thrown out of an incubator will be shrunken and weakened, and many of them will contain dead germs; that is, the remains of chicks that have started to develop. If the farmer's wife wishes to use such eggs at home, where she can examine the broken eggs before using, it is her own affair; but the sale of incubator eggs as fresh should not be tolerated.

Fertile eggs immediately after laying can not be distinguished from infertile eggs, the germ of the chick being microscopic in size. If the egg is immediately cooled and held at a temperature below 70° F., the germ will not develop. At a temperature of 103° F. the development of the chick proceeds most rapidly. This development is about as follows:

Twelve hours' incubation: Examined by a candle such an egg can not be distinguished from a fresh one. When broken in a saucer the germ spot, visible upon all eggs, seems somewhat enlarged.

Twenty-four hours: This egg, if not too dark shelled, can be readily detected by the professional candler, the germ spot causing the yolk to appear considerably darker than the yolk of a fresh egg. Such an egg is called a "heavy egg," or a "floater." When the egg is broken, the germ spot appears mottled and about the size of a dime.

Forty-eight hours: By this time the opaque white membrane which surrounds the germ has spread well over the top of the yolk, and the egg is quite dark or heavy before the light. Blood appears at about this period, but is difficult of detection with the candle, unless the germ dies and the blood ring sticks to the membrane of the egg.

Three days: The candle shows changes in this egg that are apparent even to a novice. An experienced candler will have no difficulty in seeing the blood ring through the shell. When broken the blood ring is the prominent feature, and is as large as a nickel. The yolk behind the membrane has become watery.

Four days: The body of the chick becomes visible to the candler, and the prominent radiating blood vessels are seen. Upon breaking the yolk is found to be half covered with the sac containing water.

The developments given above occur at a temperature of 103° F. As the temperature is lowered the rate of chick development is retarded, but at any temperature above 70° chick development will proceed far enough to cause serious injury to the quality of the eggs.

For commercial uses the customary grouping of eggs in regard to heating is:

1. No heat shown. Can not be told at the candle from fresh eggs.
2. Light floats. First grade that can be separated by candling, corresponding to about eighteen to twenty-four hours' incubation. Not objectionable to the average housewife.
3. Heavy floats. This group has no distinction from the preceding, except an exaggeration of the same features. These eggs are objectionable to the fastidious housewife because of the white and scummy appearance of the yolk.
4. Blood rings. Eggs in which blood has developed, extending to the period when the chick becomes visible.
5. Chicks visible to the candle.

The loss to the egg trade due to heated eggs is probably greater than that from any other source. The loss varies with the season of the year and the climate. In New England heat loss may be considered as in the same class as loss from dirties and checks. In Texas the egg business from the 15th of June until cool weather in the fall is practically dead. The southerner eats few eggs at this season, and shipping out of the State nets the producer such small returns after allowance for the losses that the farmer considers it hardly worth while to gather eggs. In the unusually hot season of 1901, throughout the entire region west of the Mississippi River, hatched chickens were commonly found in cases of market eggs, and for a time the shippers did well to net 3 cents a dozen for these eggs.

During the average season the summer egg of the South and Southwest makes no pretensions to being a sound egg in regard to heat. Even in the Central West the loss is severe. An average lot of summer eggs from the Kansas-Nebraska territory would candle up about as follows:

Candled stock, containing a large proportion of light floats, 80 per cent.

Seconds, containing heavy floats and light blood rings, 15 per cent.

Absolute loss, eggs containing heavy blood rings or chicks, 5 per cent.

Some idea of the financial loss due to heated eggs can be obtained by estimating what the eggs in the above case are worth when laid as compared with what they actually bring. The best of the heated stock referred to above is worth about 5 cents a dozen less than nearby fresh eggs in the New York market. Supposing the latter to be 25 cents, there is a loss of 5 cents. The value of the seconds, which will probably be broken as bakers' stock, will not be over 15 cents. Thus we have 80 per cent at 20 cents a dozen, 15 per cent at 15 cents

a dozen, and 5 per cent at a total loss. This makes a depreciation of 27 per cent on the original value.

In western eggs a loss due to heating or chick development of approximately one-fourth of the original value of the crop is sustained during the heated season.

The loss attributable to this element of egg deterioration is estimated at fully 5 per cent of the annual valuation of the egg crop of the country. In the East the loss would be less, while in the South it would be much greater.

The responsibility for heated eggs is almost wholly with the farmer, although the rural buyer and the freight handler are in no wise innocent.

#### EVAPORATION (HELD OR SHRUNKEN EGGS).

The eggshell is porous so that the developing chick may obtain air. This exposes the moist contents to the drying influence of the atmosphere, and evaporation takes place constantly. It is increased by warm temperatures, by dry air, and by currents of air striking the egg.

When the egg is formed within the hen the contents fill the shell completely. As the egg cools the contents shrink, and the two layers of membrane separate in the large end of the egg, causing the appearance of the bubble or air cell. Evaporation of water from the egg further shrinks the contents and increases the size of the air cell. The size of the air cell is commonly taken as a guide to the freshness of the egg, but when we consider that with the same humidity evaporation would take place much faster on a hot July day than on a frosty November morning, we see that the extent of evaporation from the egg proves little regarding the actual age. Even as a measure of evaporation the size of the air cell may be deceptive, for when an egg with an air cell of considerable size is roughly handled the membrane splits down the side of the egg and gives the air cell the appearance of being larger than it really is. Still rougher handling of shrunken eggs may cause the rupture of the inner membrane, allowing the air to escape into the contents of the egg. This causes a so-called "watery" or "frothy" egg. The quality is in no wise injured by the mechanical mishap, but eggs so ruptured are usually discriminated against in candling.

In this connection it might be well to discuss the subject of "white strength," by which is meant the stiffness or viscosity of the egg white. The white of an egg is a limpid liquid, but in the egg of good quality that portion immediately surrounding the yolk appears to be in a semisolid mass. The cause of this appearance is the pres-

ence of an invisible network of fibrous material. By age and mechanical disturbance this network is gradually broken down and the liquid white separates out. Such a weak and watery white is usually associated with shrunken eggs. These eggs will not stand up well or whip into a firm froth, and are discriminated against by dealers. The weakness of the yolk membranes also increases with age, and is objectionable because the breakage of the yolk is unsightly and spoils the egg for poaching.

The shrunken egg is most abundant in the fall, when the rising prices tempt the farmer and groceryman to hold the eggs. In fact, this holding is so prevalent that from August to December fresh eggs are the exception rather than the rule. While attention has been called to evaporation as the most pronounced fault of fall eggs, losses from other causes are greatly increased by the holding of eggs. If the eggs are held in a warm place, heat and shrinkage will cause the greatest loss; if held in a cellar, rots, mold, and bad odors will be the cause of a lowered price.

The loss in the egg business due to holding is perhaps least understood and appreciated by those outside the trade. This is due to the fact that the shrunken egg is not so repulsive as the rotten or heated egg. But the inferiority of the shrunken egg is so well appreciated by the consumer that high-class dealers find it impossible to use them without ruining their trade. This causes shrunken eggs to be constantly sent into the cheaper channels of consumption, with the result that all lower grades of eggs are a drug on the market in the fall of the year.

In the northern and eastern sections the farm and store holding of eggs is probably greater than it is in the South and West, and in the former sections the loss from this cause exceeds that from heated eggs. Taken the country over, the loss due to the holding for higher prices is probably about equal to the loss due to chick development.

#### BACTERIAL CONTAMINATION (ROTS).

In the classes of spoiled eggs which we have thus far discussed the proverbial rotten egg has not been considered. The term "rot" in the egg trade is applied in any case where an egg is absolutely unfit for food purposes. In this discussion the term "rotten egg" will be confined to the egg which contains a growth of bacteria.

The egg when laid is usually germ free, and if properly cared for will remain so. The eggshell itself is not germ proof, for the pores that admit the air for the chick to breathe are large enough to admit all forms of bacteria, but the membrane beneath the shell is germ proof as long as it remains dry. This membrane is composed of fibers crisscrossed in every direction. The dried spore of a bacte-

rium falling on this membrane would lodge in the same manner as would the body of a dead mouse upon a pile of hay; but let the right conditions of moisture and warmth be present to call the germ into activity, the membrane will be no more a barrier than the hay would be to a live mouse.

The exterior of an egg is a lodging place for bacteria and bacterial spores of all kinds, and once an egg becomes damp or is broken decomposition speedily follows. As in other products, heat favors the growth of bacteria and sufficient cold will prevent it. Unless there is moisture on the surface of the egg bacteria can not enter, and therefore dampness of the eggshell, practically speaking, is to be considered the cause of rotten eggs. Damp membranes may come from water externally applied, from the "sweating" of eggs coming out of cold storage, or from preventing evaporation to such an extent that the internal moisture of the egg thoroughly soaks the membrane. The latter occurs in damp cellars or when eggs are covered with some impervious material. Rotten eggs may be of different kinds, according to the species of germ that causes the decomposition. The specific kinds of egg-rotting bacteria have not been worked out, but the following three groups of bacterially infected eggs are readily distinguishable in the practical work of egg handling:

1. *Black rots*.—It is probable that many different species of bacteria cause this form of rotten eggs. The prominent feature is the formation of hydrogen-sulphid gas, which blackens the contents of the egg, giving the characteristic rotten egg smell and sometimes causing the equally well-known explosion.

2. *Sour eggs or white rots*.—These eggs have a characteristic sour smell. The contents become watery, the yolk and the white mixed, and the whole egg offensive to both eye and nose.

3. *The spot rot*.—In this case the bacterial growth has not contaminated the entire egg, but has remained near the point of entrance. Such eggs are readily picked out with the candle, and when broken show lumpy adhesions on the inside of the shell. These lumps are of various colors and appearances. It is probable that spot rots are caused as much by mold as by bacteria, but for practical purposes the distinction is immaterial.

In practice it is impossible to separate rotten from partly hatched eggs, for the reason that in the typical nest of spoiled eggs found around the farm both causes have been at work. Dead chicks will not necessarily cause the eggs to decay, but many such eggs do become contaminated by bacteria before they reach the candler, and hence show complications.

The loss of eggs that are actually rotten is not as great as one might suppose. Perhaps 1 or 2 per cent of the year's output actually rots,

but the expense of the candling and the lowering of the value of the egg crop are severe losses for which the rotten eggs are to blame. The responsibility for decayed eggs is to be shared between the farmer who allows hens to lay in the weeds or under the barn, and the dealer who holds the eggs in damp cellars or poorly managed storage rooms awaiting higher prices.

#### MOLDING OR MUSTINESS.

Moldy or musty eggs are caused by the accidental wetting of cases or by storage in very damp cellars or ice houses. The moldy egg is also frequently affected with spot rot. In the musty egg proper the egg meat is free from organisms, but has been tainted by the odor of the moldy growth upon the eggshell or the packing materials.

#### ABSORPTION OF ODORS.

The absorption of odors is the most baffling of all causes of bad eggs. Here the candler, so expert in other points, is usually helpless. Eggs, by storage in musty cellars or in rooms with citrus fruit, vegetables, fish, or cheese, may become so badly flavored as to be seriously objected to by a fancy trade, and yet there is no means of detecting the trouble without destroying the egg. Such eggs occur most frequently among the held stock of the fall season.

#### SUMMARY OF LOSSES DUE TO DETRIMENTAL CHANGES.

The amount of loss to the egg trade caused by needless deterioration runs into very large figures. The absolute prevention of loss can not be attained, but the estimation and classification of the cost of deterioration should serve to call attention to its extent and to show where the remedy is most needed. Summarizing from the previous discussion, we find the loss from each class as compared with the total crop value about as follows:

	Per cent.
Dirtyes.....	2
Breakage .....	2
Chick development.....	5
Shrunken or held eggs.....	5
Rotten eggs.....	2½
Moldy and bad flavored eggs.....	½
Total.....	17

#### LOSS BY CURTAILED CONSUMPTION.

Besides the loss figured above, which is based upon our present system of prices, there is a loss less tangible but none the less real; that is, the loss due to curtailed consumption. People do not like bad eggs, and if such are served to them they are inclined next time to

order something else. This cuts down the demand and lowers the price. Any city egg dealer realizes how quickly the buying public of the better class adapts its consumption to the quality of the product. In fact there is hardly any class of consumers, however careless, but will increase consumption when the product is improved.

While the loss from curtailed consumption can not be estimated, it is readily apparent that if high quality in eggs were the rule rather than the exception it would result not only in a gain from decreasing the losses previously pointed out but in an even greater gain from an increase in the general price level.

Some idea of the difference between the amount realized for eggs as they are commonly handled and the present valuation placed on really high-grade goods may be obtained by a comparison of the actual prices realized for all eggs sold in New York City and the prices offered by a New York firm doing an extensive business in strictly high-grade eggs. The contrasted figures for the year 1907 are as follows:

*Comparison of monthly average prices of total egg receipts at New York City with prices offered by a New York firm for high-grade eggs, for the year 1907.*

Months.	Weighted average of prices (per dozen) at which total New York egg receipts moved.	Wholesale prices (per dozen) for strictly fresh eggs.
	<i>Cents.</i>	<i>Cents.</i>
January .....	25.8	42
February .....	24.5	40
March .....	19.3	32
April .....	16.9	30
May .....	16.6	31
June .....	15.5	32
July .....	15.6	35
August .....	17.7	38
September .....	20.7	40
October .....	21.4	42
November .....	26.0	45
December .....	27.7	42

<sup>a</sup> By weighted average is meant an average of the prices of various grades in the computation of which the relative proportion of each grade is considered.

Of course it is not possible to bring the entire egg crop of the country up to the higher values, but the fact that there is a definite market for eggs of first-class quality at almost double the prices for which the egg crop as a whole is actually sold is a point very significant to the ambitious egg producer.

#### THE CONSUMER'S POSITION.

The eggs of the United States are worth much more when laid than they are when they reach the consumer. Now, if they reached the consumer in good condition, he would pay a greater price and would

receive better eggs and more of them. The only change that would occur in consumption would be that the poorer consumer, who now eats low-grade eggs, would be obliged to substitute some other food for them, and that the more fortunate consumer, who now limits his consumption because of poor quality, would increase his use of eggs at the expense of other foods. The consumer would pay an extra price, but would receive full value for his extra expenditure, and would gladly welcome the change.

#### INCREASED GAIN TO DEALERS AND FARMERS FROM IMPROVED METHODS.

In industries where monopolies exist the burden of loss may be forced upon the producer of the raw product or the consumer of the finished article and extra profits turned into the pockets of the middleman. In the egg trade competition is open and free, and the profit of improved methods or the loss due to waste is necessarily distributed according to definite principles among all those concerned in production, transportation, and sale. The dealer's share of the increased income from better methods would be somewhat greater than his proportionate share of the increased receipts.

Suppose, as an illustration, that 15 per cent of the present valuation is the amount that goes to dealers, transportation companies, and other agencies that enter into the wholesale egg business. Under ideal trade conditions more careful methods would be used by buyers, railroad companies, and city receivers. This would require more intelligent workmen and greater expense for the facilities used. A liberal estimate for the expenses of this improved service would be one-third of the present cost of doing business, which would make a share of 20 per cent for these agencies. The increased income thus apportioned to the dealer for his reward is only 5 per cent of the value of the egg crop. This is but a small factor of the entire increase in value which we would expect under radically improved methods. It is fair to assume that the egg dealer will get a fair share of any increase in the value of the egg crop, but as his share is always a comparatively small percentage of the total value the farmer will be the chief gainer in any general rise in the final selling price.

#### METHODS OF MARKETING EGGS.

The method by which the larger number of American eggs pass from the producer to the consumer is as follows:

The eggs are gathered by the farmer with varying regularity and are taken, perhaps on the average of once a week, to the local village merchant. This merchant receives weekly quotations from a number of surrounding egg buyers, and at intervals of from two days to two

weeks ships his eggs by local freight to such dealers. The dealer buys the eggs "case count;" that is, he pays for them by the case, regardless of the quality. He usually repacks the eggs in new cases and may or may not candle them.

This dealer in turn receives quotations from city egg houses and sells the eggs by wire. He usually ships in carload lots. The city receiver may also be a jobber who sells to grocers or he may sell the carload outright to a jobbing house. The jobber recandles the eggs, sorting them into a number of grades, which are sold to various classes of trade.

The foregoing method of marketing American eggs applies more especially to those produced west of the Mississippi River and marketed in the very large cities of the East.

We will now discuss the various steps of the egg trade, pointing out the reason for the existence of the present methods and their influence upon quality and consequent value.

#### THE COUNTRY MERCHANT.

The general store is the most common market for the farmers' eggs. This general store may be the crossroads trading place or the ambitious department store in a town of 5,000 population. Eggs, being a perishable crop continuously produced, must be marketed at frequent intervals. The trips to the general store, necessary to supply the household needs, offer the most convenient opportunity for this marketing; but there is a reason for the general merchant being an egg buyer that is more interesting and far-reaching in its effect upon the egg trade. The merchant buys eggs because by doing so he can control his selling trade. There are two reasons why the farmer trades where he sells his eggs: (1) Because it is convenient to trade at one place, and (2) because he wishes to avoid offending the merchant, which he would do if he broke the established custom of trading out the amount.

The merchant knows that to buy eggs means to sell goods, and he therefore bids for eggs. His competitors in the same town, as well as in other towns, also bid for eggs. The effect to the merchant of lowering the price of his goods or raising the price of eggs is financially the same. In either case it is the matter of cutting prices under the spur of competition. Now, the articles on which the merchant makes his chief profits are dry goods and notions. Such articles are not standardized, but their real value varies in a manner quite impossible of estimation by the unsophisticated. On the other hand, eggs are quoted by the dozen, and all who run may read.

Suppose, for illustration, two merchants in the same town are each doing business with a 20 per cent profit and are buying eggs at 10

cents and selling for 11, the 1 cent advance being sufficient to pay for the labor of handling, incidental loss, and a small profit. One merchant concludes to cater for more trade. If he marks his goods down he will gain some extra trade, but people will fear his goods are cheap. But let him put out a placard "Eleven cents paid for eggs," and the farmers will throng his store and be less inclined to question the quality of his goods. This move having been successful, his rival across the street quietly stocks up with a cheaper line of dry goods, and one fine morning puts out a card, "Twelve cents paid for eggs," and more farm wagons will be hitched on his side of the street. The volume of business at the lower profit being insufficient to maintain two men in the town, a mutual understanding is gradually brought about by which the prices of goods sold are worked back to the basis of 20 per cent gross profit, but the false price of eggs serves to draw the trade from neighboring towns, and is maintained at the higher level.

As a matter of fact the price paid to farmers for eggs by the general stores of the Mississippi Valley is frequently 1 to 2 cents above the price at which the storekeeper sells the product. Allowing the cost of handling, we have a condition prevailing in which the merchant is handling eggs at from 5 to 10 per cent loss, and it stands to reason that he is making up the loss by adding to the prices of his goods.

Some of the effects of this system are:

1. The inflated price of merchandise is an injustice to the townspeople and to farmers not selling produce; in fact, it amounts to a taxation of these people for the benefit of the egg producers.
2. The inflated prices of the merchant's wares work to his own disadvantage in competition with mail-order or out-of-town trade.
3. The farmer who exchanges eggs for dry goods is not being paid more for his eggs, save as the tax on the townspeople contributes a little to that end, but is in the main merely exchanging more dollars.
4. The use of eggs as a drawing card for trade works in the favor of inferior produce, and the loss to the farmer through the lowering of prices thus caused is much greater than his gain through the forced contributions of his neighbors.

#### THE EGG SHIPPER.

The second step in the usual method of egg marketing is the sale of eggs collected by the small storekeeper to the produce man or shipper.

Throughout the Mississippi Valley there are wholesale produce houses at all important railroad junctions. A typical house will ship the produce of from one to three counties. These houses, once a week or oftener, send out postal-card quotations. These quotations read so

much per case and are usually case count, with a reservation of the privilege to reject or charge loss on goods that are utterly bad. Each grocery receives quotations from one to a dozen such houses, and perhaps from commission firms in the nearest city. The highest quotation naturally gets the merchant's shipment. The dealer repacks the eggs and usually candles them, the strictness of the grading depending upon the intended destination.

The loss in candling is generally kept account of, but is seldom charged back to the shipper. The egg man wants volume of business, and if he antagonized a shipper by charging up his loss the usual result would be loss of trade. So the buyer estimates his probable loss and lowers his price enough to cover it.

By "loss off" or "rots out" is meant the subtraction of the bad eggs from the number to be paid for. Buying on a "candled" or "graded" basis usually not only means "rots out" but that a variation of the price is made for two or more grades of merchantable eggs.

Much discussion prevails among the western egg buyers as to whether eggs should be bought "loss off" or "case count." Loss-off buying seems to be more desirable and just, but in practice is fraught with difficulties. If the loss-off buyer finds his profits small, he may instruct his candlers to grade more closely, which means he will pay less. Whether done with honest or dishonest intention, the buyer sets the price to be paid after he has the goods in his own hands, an obviously difficult commercial system.

Where the buyer in one case changes the grading basis to protect himself, there are probably ten cases where the eggs really deserve the loss charged, but the tenth chance gives the storekeeper an opportunity to nurse his loss with the belief that he has been robbed by the buyer. Such a feeling of distrust is disagreeable, and the results are that where one of two competing egg dealers buys "loss off" and the other "case count," the case-count man will get most of the business.

The case-count method being the path of least resistance, the loss-off system can only succeed where there is some factor that overcomes the disinclination of a shipper to let the other man set the price. This factor may be (1) the exceptional reputation of a particular firm for honesty and fair dealing; (2) exceptional marketing opportunities for fancy goods, enabling the loss-off buyer to pay appreciably higher rates for good stuff when subject to candling; (3) a condition that prevails in the South in the summer, where the losses are so heavy that the dealers will not take the risk involved in case-count buying; or (4) some sort of a monopoly.

The monopolistic enforcement of the loss-off system of egg buying has frequently been attempted in sections of the West by an agree-

ment among egg men. The usual experience has been unsatisfactory. Some party to the agreement would get anxious for more business and quietly begin quoting case count, and as a result would get the business of the disgruntled shippers in his section. When one buyer begins quoting case count the remainder rapidly follow suit, and this form of buying is quickly reestablished.

#### THE CITY EGG DEALER.

City egg dealers are usually commission houses, but in practice most large lots of eggs are now bought by telegraph and the prices definitely agreed upon before shipment. In the larger cities egg dealing is supervised by a produce exchange or board of trade. Such exchanges frequently have rules of grading and an official inspector. This gives stability to egg dealing and for city transactions largely solves the problem of uncertainty as to quality so annoying to the country buyer. Even where official inspection is not resorted to, personal inspection by the buyer is practicable in city trading, and one may know what he is getting.

In many cases, especially in smaller cities, the receiver is the jobber, otherwise he sells the eggs that he has purchased, or that are consigned to him, to a firm that makes a business of selling them in small quantities to groceries, restaurants, etc. The jobber grades the eggs as the trade demands. In a western city this may mean two grades, good and bad; in New York it may mean seven or eight grades, the finer of these being packed in sealed cartons or each egg may be stamped with the dealer's brand.

#### THE CITY RETAILER.

The city retailers of eggs include groceries, dairies, butcher shops, drug stores, hotels, restaurants, and bakeries. The grade of eggs handled will, of course, vary greatly in all these classes.

The soda fountains of drug stores and the first-class hotels are among the higher bidders for strictly high-grade eggs. Many such institutions in eastern cities are supplied directly from large poultry farms. The figures at which such eggs are purchased are frequently at a given premium above the market quotation or a year-round contract price for a given number of eggs per week. This premium may range from a cent or two in western cities to as high as double the market quotations in New York or Boston. An advance of 10 cents over the quotation for extras or a year-round contract price of 35 cents a dozen might be considered typical of such arrangements in New York City.

Another class of trade in high-grade eggs in which there has recently been encouraging developments in some cities is the retailing of eggs in wagons. This business is sometimes conducted in connection with dairy routes.

Some of the larger grocers in New York City are in the market for strictly fresh eggs and for the purpose of securing such a supply have installed departments in charge of expert egg men. Traders of this class frequently attempt to secure their supplies directly from farmers and poultry men. The great weakness of the plan is that a premium is offered which tempts the farmer to go out and buy eggs from his neighbors. The result is disastrous, for the quality becomes uncertain, and the farmer must be dropped from the list. In order to be successful such a system of buying must be based upon a grading system that will so exaggerate the premium on very high-grade goods and so depreciate any inferiority that the farmer will find it unprofitable to ship any eggs but his own or those of a neighbor who is equally reliable and who is on the inside of the deal.

The great bulk of eggs move through the channels of the small restaurant, the bakery, and the small grocery. In the smaller cities of the Central West the grocer retails eggs at a margin of 1 to 3 cents a dozen. In the South and farther West the margin is 2 to 7 cents, the retail price always being in the even nickel. In the eastern cities the grocer's margin is 2 to 5 cents.

All eggs offered for sale are usually claimed by the salesman to be "strictly fresh" or the "best," and yet the price of eggs on sale that same day in the same city may vary, if it be in April, from 15 to 35 cents, or if it be December, from 30 to 75 cents a dozen. In the large cities there exists the custom unknown in the small towns of having two or more grades of eggs for sale in the same store.

The profits of the city retailer are by far the largest item in the marketing of eggs. An approximate idea of the profits of the various handlers of eggs may be obtained from the following figures, which represent an imaginary summer shipment:

*Elements of cost of a dozen eggs purchased by a New York consumer.*

	Cents.
Paid the farmer in Iowa.....	15
Profit of country store.....	0
Gross profit of shipper.....	$\frac{3}{4}$
Freight to New York.....	$1\frac{1}{2}$
Gross profit of receiver.....	$\frac{1}{2}$
Gross profit of jobber.....	$1\frac{1}{4}$
Loss from candling.....	2
Gross profit of retailer.....	4
Cost to consumer.....	25

The cheapest grade of eggs sold is taken by bakeries and by low-class restaurants. An egg when cooked with other food may have its flavor and appearance so disguised that it may be safely used, whereas if served alone it would be very repulsive. Measures have frequently been taken by city boards of health to stop the sale of "spot rots" and other low-grade eggs. The great difficulty with such regulations is that they are difficult of enforcement, because no definite line can be drawn as in the case of adulterated or preserved products. That embryo chicks and bacterially contaminated eggs are consumed by the million can not be doubted. The egg from the well-kept flock, the subsequent handling of which has been conducted with intelligence and dispatch, is the only egg whose "purity" can be assured, and the encouragement of such production and such handling is one of the most practical means by which the quality of eggs in the general market may be materially improved.

#### VARIATIONS IN TRADE METHODS.

From the above outline of egg marketing, any of the steps mentioned may be left out, while in other cases steps may be added. The poultry farms of the East usually ship their product direct to the city, either to a grocer or a hotel or to a dealer with a fancy trade. The ordinary farm eggs of the East, as well as many of those of Ohio, Indiana, Michigan, and Illinois, move directly from the storekeeper to the commission houses of the surrounding cities, without passing through the hands of a produce buyer. The fact that the railroad rates east of the Mississippi River are the same for small shipments as in car lots encourages this style of shipping.

In the regions of heavy egg production, both East and West, many small egg dealers buy direct from the farmers, paying a cash price. The relation of this cash price to the trade price paid at the country store varies in different localities. One cent below the country store price in trade is customary in Kansas, while in Michigan and Ohio the cash price of the dealer is usually equal to that offered at the store. The local produce dealer may occasionally buy eggs from the merchant to ship with his own, in which case he will generally allow the merchant half a cent more than his own cash price to the farmer. The presence of a cash buyer is usually coincident with the development of the poultry industry to a point where the eggs sold will more than pay the bills that a farmer would run at a general store.

The huckster or peddling wagons which gather eggs and other produce directly from the farm prevail east of a line drawn from Galveston to Chicago through Texarkana, Ark., Springfield, Mo., and St. Louis. West of this line the huckster is almost unknown.

The huckster may be of the following types:

1. An employee of the local grocery store, trading merchandise for eggs.
2. An independent traveling peddler.
3. A cash dealer who buys his load and hauls it to the nearest city, where he peddles the produce from house to house or sells it to the city grocers.
4. An agent of a local produce buyer, working on a salary or commission.
5. A produce buyer who does not visit the farm at all, but conducts a system of rural freight service for the purpose of collecting eggs from country stores.

As far as quality of product and advantage to the farmer are concerned, the fourth style of huckster is preferable. This style exists chiefly in Indiana and Michigan and in some regions of Kentucky and Tennessee. The writer found such hucksters in southern Michigan working on a profit of half a cent a dozen, while in the mountains of Tennessee he found a huckster paying 10 cents for eggs when they were worth 18 cents in Chattanooga and 23 cents in New York.

The huckster scheme of gathering eggs would seemingly be a means of obtaining good eggs because of the advantage of regularity of collection, but in reality it does not always work out that way. While it must be admitted that in the isolated districts of the Middle and Southern States the presence of the huckster is the only factor that makes egg selling possible, it is also true that the peddling huckster of those regions usually disregards the first principles of handling perishable products. He makes a week's trip in sun and rain with his load of produce, and the result is that the quality of his summer eggs is about as low as can be found. In the more densely populated region with a daily service, or even a twice or thrice a week service, the huckster egg becomes the finest farm-produced egg in the market.

#### THE COLD STORAGE OF EGGS.

A very brief discussion of this subject will be sufficient for the purposes of this article.

The cold-storage egg industry is a development of the last twenty-five years. Undoubtedly the industry as a whole has been of great benefit to both egg producer and egg consumer. It has tended toward the leveling of the price of eggs throughout the year and has resulted in a large increase in the fall and winter consumption. This means a larger total demand and a consequent increase in price.

Owing to the fact that eggs are spoiled by hard freezing, they must be kept at a higher temperature than meat and butter. Temperatures

of from 29 to 32° F. are used in cold storage of eggs. At such temperatures the eggs, if kept in moist air, become moldy or musty. To prevent this, the air in a first-class storage room is kept moderately dry, which shrinks the eggs, though much more slowly than would occur without storage. The growth of bacteria in cold storage is practically prevented. If bacteria are in the eggs when stored, the growth will be checked, but activity will begin again when the eggs are warmed up. Figure 2 shows how eggs are stored in a large cold-storage plant.

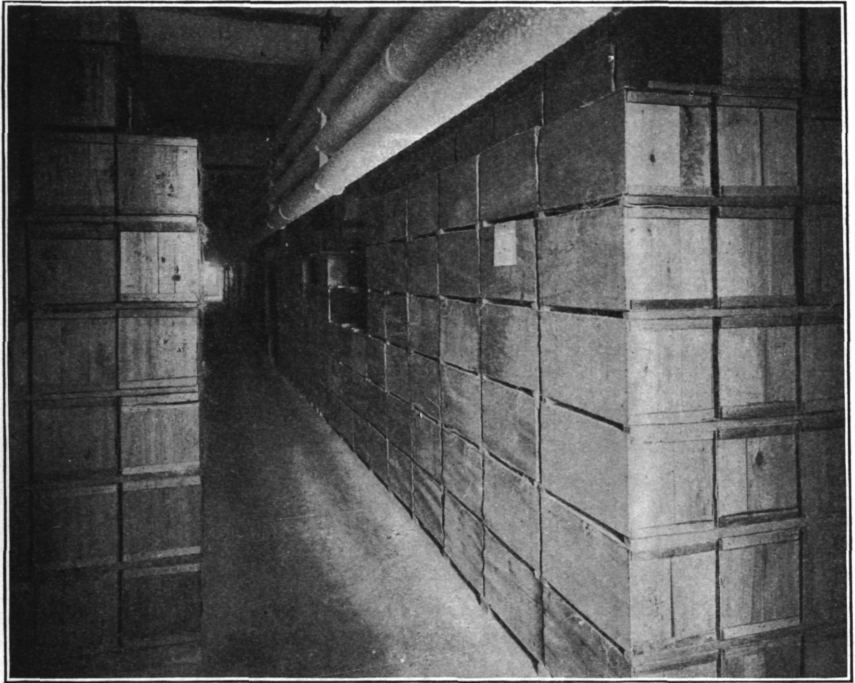


FIG. 2.—Egg room in a large eastern cold-storage plant.

Speaking generally, the cold-storage egg, while not unwholesome, is inferior in flavor and strength of white to a fresh egg. The cold-storage egg can be very nearly duplicated in gross appearance and quality by allowing eggs to stand for three or four weeks in a dry room. Cold-storage eggs, when in case lots, can be told by the candler because of the uniform shrinkage, the presence of mold on cracked eggs, and, perhaps, the occasional presence of certain kinds of spot rots peculiar to storage stock; but the absolute detection of a single cold-storage egg by candling is, so far as the writer knows, impossible.

With the present prevailing custom of holding fall eggs without storage facilities, it is frequently true that eggs placed in cold storage

in April are superior to current fall and early winter receipts. Cold-storage eggs are usually sold wholesale as cold-storage goods, but are retailed simply as "eggs."

The fall eggs offered to the consumer cover every imaginable variation in quality, and the poorest ones sold may or may not be cold-storage stock.

#### PRESERVING EGGS BY OTHER MEANS THAN COLD STORAGE.

Occasional articles have been printed in agricultural papers calling attention to the fact that the cold-storage men were reaping vast profits which rightfully belonged to the farmer, and advising the farmer to send his own eggs to the storage house or to preserve them by other means. As a matter of fact, the cold storage of eggs has not of late years been particularly profitable, there having been severe losses during several seasons. Even were the profits of egg storing many times greater than they are, the above advice would still be unwise, for the storing, removing, and selling of the farmer's individual case of eggs would eat up all possible profit.

When eggs in the hands of large operators are properly preserved in cold storage, the best and most efficient methods known are in reality at the farmer's service. Because of the severe competition that prevails in egg storing, the farmer is paid all the increase in price which the business will stand. A comparison of the summer prices of eggs now with summer prices before days of cold storage will substantiate the truth of this statement.

As for other methods of egg preservation, including the much recommended water glass or sodium silicate, it should be said that eggs may be successfully preserved by such means, and there can be no objection offered against the farmer preserving eggs in this manner for his own use. Such methods of egg preservation have been much sought after by experiment station workers and others interested in the farmer's welfare, but a study of the egg trade shows that efforts along this line have really acted as a boomerang and in the long run have caused more loss than gain to egg producers. The reason for this lies in the fact that in common practice efforts at egg preservation are frequently failures, and at best they result in the dumping on the market of what is known in the egg trade as "pickled eggs." These eggs must not only be sold at a low price themselves, but their presence casts suspicion on all eggs, thus tending doubly to suppress the price paid to the farmer.

Although an individual farmer may appear to make a few cents by holding or pickling his eggs, the gain is apparent only, for the destruction of wealth involved in the injury to the quality of the egg must, as has already been shown, be borne by the farmer himself.

Above all else, the infallible rule concerning the marketing of eggs is for the farmer to sell his eggs as soon as possible after they are laid.

#### HOW TO EFFECT IMPROVEMENT.

Stopping the loss in our egg trade would pay abundantly, but under our present system the reward for individual effort is shared by all, and the loss due to carelessness and dishonesty is also borne by all. If eggs are to be well handled, every man who handles them must know that he is being paid for his extra pains.

To save the millions of dollars which are carried down our sewers in the shape of bad eggs we must have, first, a campaign of education among egg producers that will show every farmer's wife that when eggs are allowed to remain in damp nests, under broody hens, or in hot kitchens there is a loss of quality which means an actual loss of money to herself and to her neighbors; and, secondly, a system of buying eggs that will as nearly as possible recompense every producer who sells eggs exactly in accordance with what those eggs are worth.

#### PURE-FOOD LAWS.

During the summer of 1907 the pure-food commissioner of Minnesota issued placards putting rotten eggs under the ban of the pure-food law. Several arrests of farmers and dealers were made, the parties invariably pleading guilty. In 1908 a number of Western States followed the example of Minnesota in challenging the sale of rotten eggs. The degree to which this movement was carried depended upon the efficiency of the organization of the several pure-food departments or commissions.

For the enforcement of such laws dependence can not be placed upon the dealers. If a merchant receives a lot of inferior eggs from a wealthy farmer whose trade is worth many times the value of the eggs, it is useless, under the present competitive conditions, to expect the merchant to act as complainant and prosecuting witness. In enforcing such laws it is of value to have food inspectors who are trained as practical egg candlers and whose testimony, together, perhaps, with that of some disinterested witness, before whom the bad eggs may be broken, would be sufficient evidence in court.

One of the advantages of such laws is that they call the attention of the farmer to the wrong that he may be carelessly committing and create a fear of a possible disgrace by arrest and prosecution.

#### BUYING ON A QUALITY BASIS.

The readiness with which the loss is brought home to a producer selling his eggs directly to a fancy trade is apparent. The extension of such trade is certainly desirable from this standpoint, but with

the exception of a few favorably located individuals this plan is impracticable. The sale of the farmer's eggs directly to city dealers with a fancy trade is almost as efficient a method as selling directly to the consumer, but in this case the fear of losing the farmer's shipments becomes a factor in making the receiver less strict in the matter of holding the producer to a high standard. This method, like the former, is limited in application to regions near our best consuming centers.

The next step involves the local buyer in the community where the eggs are produced. If the buyer who buys from the farmer is also the shipper to the final market the problem is not difficult. In this case the farmer should be paid for quality and given an opportunity to see the inspection of his own eggs.

Such a scheme works nicely where the buyer has a monopoly, but where he has competition he finds it difficult to hold his trade. The farmer does not realize the effects of his own carelessness, and considers it impertinent to question the quality of his produce. As it requires time to produce improvement in a neighborhood, and the small buyer's goods will be considered ordinary until he has forced recognition of their extra quality, he will at first have difficulty in paying sufficient excess over his competitor to overcome the farmer's antagonism for the quality buying; hence the frequent failure of this plan.

It seems unfortunate that the farmers of a community having an enterprising buyer do not realize the advantage that would accrue to themselves from the establishment of a system of quality buying and the consequent upbuilding of the reputation of the community as a source of high-grade eggs.

In more remote and less productive regions the problem is not as easy of solution. Here there are fewer towns that can support an establishment buying direct from the farmers, and freight rates oblige such a buyer to sell to a car-lot shipper, thus lessening the chances of his receiving full valuation for his better eggs. Such localities have two distinct problems in quality buying: (1) How to pay the farmer on a quality basis; (2) how to pay the man who buys from the farmer on a quality basis.

Clearly the buyer must be able to get more for good eggs than for bad eggs before he can be asked to make a distinction to the farmer. This involves the question of "loss-off" buying, the difficulties of which have already been discussed. The shipper can not afford to pay much extra to an occasional dealer buying "loss off" from the farmer, as the small shipment of high-grade goods would be run in with a carload of store receipts and its identity lost.

There should be, however, within shipping reach of every community some city of such size that grocers could be found who, at least during the summer and fall months, would pay a sufficient advance for a high grade of eggs to make it profitable for a local buyer to deal on a quality basis.

#### REMEDIES FOR THE GENERAL-STORE EVIL.

The general store, where the great majority of the eggs first leave the farmers' hands, is above all the weakest spot in the industry. The merchant can not candle, for he has not time, facilities, or knowledge; and what is still more significant, he does not want to candle, if he can help it, because the farmers' trade is worth more than the loss on the eggs, and as long as competition exists the first effect of candling will be to disgruntle the farmers and lose their trade.

The evil of the general store is not alone because it does not buy on a quality basis, but because, in order to hold the farmers' trade in dry goods, it bids up the price on eggs, case count, until the loss-off buyer can not do business.

The following are suggested as remedies for the evils of the general-store system of buying eggs:

1. Establishment of a case-count cash buyer. The establishment of a cash market is a distinct step in advance. It makes the farmer independent of the trade market, and brings him in contact with a man who will be more liable to educate him in the production of high-grade produce. The cash buyer is at present established in all the larger country towns east of the Mississippi River and north of Tennessee. In the West cash buyers are less frequent, but the system is spreading rapidly. The chief difficulty is the unduly high level of prices at the stores, which makes it hard for the cash buyer to pay enough to get a reasonable share of the goods.

2. A cash dealer, buying loss-off from the farmer. This plan, already discussed, is a distinct improvement of the case-count buyer, but is still more difficult of establishment. It is rarely found west of Indiana.

3. The agreement of the merchants to turn all egg buying over to the produce buyer. This has been successfully done in a few instances, but there are not many towns in which those interested will stick to such an agreement. The worst fault with this plan is that when the egg buyer is given a monopoly he is tempted to lower the farmers' prices for the purpose of increasing his own profits. Even if this is not done the competition of neighboring towns where trade prices are on a high level is a very serious handicap. In the long run the town with the loss-off buying and the cash market should be able to give

better prices than the more negligent competing point, but these fights hinge on immediate and not ultimate prices.

4. The buying of eggs at the creameries has been much talked of. The greatest difficulty in this has been the opposition of the merchants, who through numerous ways available in a small town may retaliate and injure the creamery patronage to an extent greater than the newly installed egg business will repay.

5. Another plan is a modification of the preceding, in which the produce buyer is on a salary. This scheme has been successfully carried into effect in some Nebraska towns, and to the writer seems to be the most hopeful solution of the egg-buying problem. It eliminates the temptation of the buyer to use his privilege of monopoly to fatten his own pocketbook. The weakness of the plan is that a salaried man's efficiency in the close bargaining necessary to sell the goods is inferior to that of the man trading for himself. This might be remedied by having the determination of price to be paid and the negotiation of the sale of the product left to one of the merchants in the association. Other difficulties are the getting together of a group of merchants who will live up to such an agreement; the objection of the farmers to driving to two places; the competition of other towns; the merchant's realization that the farmer with cash in his pocket or a check good at all stores is not as certain a trader as one standing, egg basket on arm, before the counter; and last and most convincing, the merchant's further realization that any fine Saturday morning, with eggs selling at 15 cents at the produce house, he may stick out a card "Sixteen cents paid for eggs" and make more money in one day than his competitors have made all the week.

6. Cooperation among farmers has made less headway in the United States than in other countries. The two chief examples of its success here are the fruit trade of California and the cooperative creameries, of which some 2,200 are in operation at the present writing. To the writer's personal knowledge, there is only one farmers' cooperative egg-marketing association in existence in the United States, and that has been kept up more from a desire to adhere to a principle than because the members were financially reimbursed for their extra trouble.

About one-half the egg business of Denmark is handled by co-operative egg-export societies, which proves that such a method of egg marketing can be successfully carried on. The other half of the Danish egg trade is handled by private dealers, who are equally severe in rejecting bad eggs and maintaining the quality, from which we may judge that the system of egg handling by private dealers is also capable of putting out a high grade of eggs.

Whatever may be the means by which improvement in the egg trade is brought about, some form of regular gathering of the eggs is essential, and for this purpose in all thickly settled regions the house-to-house wagon is the best.

It must not be thought, however, that the huckster wagon, without good management back of it, is a cure for the evils of the present situation. If the huckster capriciously puts the price up and down and the farmer holds his eggs from week to week to catch the huckster at the best time, the system is no better than the grocery-store trading.

#### BUYING EGGS BY WEIGHT.

Much has been said of buying and selling eggs by weight. As far as selling to the consumer is concerned, the present method is more feasible, namely, to grade according to the size and other qualities and sell by the dozen according to the grade.

In Denmark all eggs are bought from the farmers by weight and sold by the dozen in standardized grades. Some form of discrimination against small eggs is undoubtedly a part of the needed reform in buying eggs from the producers. This discrimination may be brought about by buying by weight, by docking all lots of eggs of less than a certain average weight, or culling out all eggs less than a given weight or size and paying a considerably lower price for these culls. Any of these ways would speedily result in weeding out the flocks of hens laying small eggs.

#### REQUISITES FOR THE PRODUCTION OF GOOD EGGS.

As requisites for the production of good eggs and marketing them in good condition the following may be mentioned:

1. Hens that produce not only a goodly number of eggs but eggs of moderately large size (weighing 2 ounces each on an average). Plymouth Rocks, Wyandottes, Rhode Island Reds, Orpingtons, and Leghorns or Minorcas that are used on egg farms are varieties that may be expected to do this.
2. Good housing, regular feeding and watering, and, above all, clean, dry nests.
3. Daily gathering of eggs, and, when the temperature is above 80°, gathering twice a day.
4. The confining of all broody hens as soon as discovered.
5. The rejection as doubtful of all eggs found in a nest that was not visited the previous day. Such eggs should be used at home, where each may be broken separately.
6. The placing of all summer eggs, as soon as gathered, in the coolest place available.

7. The prevention at all times of moisture in any form coming in contact with the eggshells.

8. The disposal of young cockerels before they begin to annoy the hens. Also the selling or confining of old male birds from the time hatching is over until cool weather in fall.

9. The using of cracked and dirty as well as small eggs at home. Such eggs, if consumed when fresh, are perfectly wholesome, but when marketed are discriminated against and are likely to become an entire loss.

10. The marketing of all eggs at least once a week, and oftener when convenience allows.

11. Keeping eggs as cool and dry as possible while on the way to town and while in country stores.

12. Keeping eggs away from musty cellars or bad odors.

13. The use of strong, clean cases and good fillers.

14. The shipping of eggs to the final market at least once a week and as much oftener as possible.

#### GENERAL SUMMARY.

I. The loss in this country due to the actual spoiling of eggs constitutes an enormous waste, which could in a large measure be saved were eggs given reasonable care from the time of laying until they reach the consumer.

II. There are two main reasons why such care is not being given: (1) Lack of realization of the importance of the egg crop and ignorance of the correct method of caring for the product; (2) because with our present system the individual farmer, and in the West the individual storekeeper as well, are not financially rewarded for their greater pains nor held accountable for gross carelessness, which may amount to actual dishonesty.

III. The ideal condition of the egg trade is to bring the intelligent dealer who wants quality and will pay for it into close touch with the producer. Every factor in the egg trade that prevents this is detrimental to the progress of this important branch of intensive agriculture.

IV. The greatest handicap to the egg trade is the general store, with its custom of bartering merchandise for eggs. The storekeeper reckons his profits on goods as more than his loss on eggs. He does not try to enforce improvement upon his patrons by buying on a quality basis, and by the advantage his peculiar position gives him he keeps other egg buyers from doing so.

V. The cure for this evil consists in teaching the farmer and the merchant that the present method of trading is upon a false basis,

which is of no real advantage to either, but is in reality a great disadvantage to both in that it causes an actual loss of wealth which must be borne by the community. When such an understanding is established the community is ready for some plan of buying eggs that will pay the producer in accordance with the actual worth of the product. This done, and a market found where the improved goods will be recognized and paid for, the future of the egg and poultry industry in that community is simply a matter of patience and perseverance.

[Cir. 140]

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